

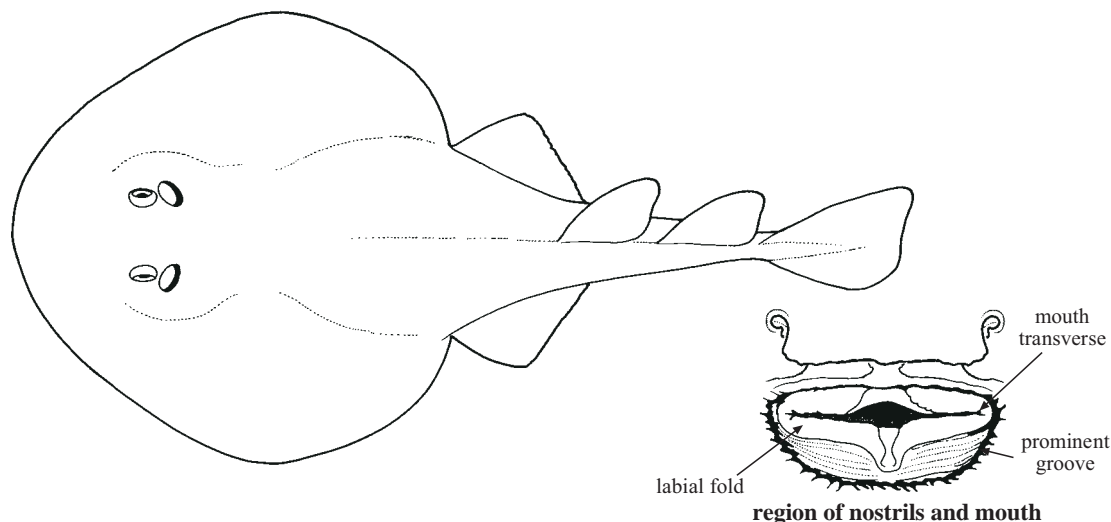
Order TORPEDINIFORMES

NARCINIDAE

Numbfishes

by M.R. de Carvalho, L.J.V. Compagno and P.R. Last

Diagnostic characters: Small to medium-sized batoids (maximum total length between 15 and 66 cm, commonly less than 50 cm), with large oval, rounded to shovel-shaped pectoral discs and stout shark-like tails; disc and tail of equal length or tail longer than disc length, tail also longer than disc width. Body entirely naked above and below, without dermal denticles or thorns. Trunk depressed and flattened, not shark-like. Precaudal tail moderately depressed, usually with variously developed lateral ridges on sides, tail abruptly narrower than trunk; no barbed sting (stinger or stinging spine) on dorsal surface of tail behind dorsal fins, no electric organs in tail. Head broad and depressed; snout moderately elongated, broadly rounded or obtusely rounded-angular; snout supported by large, anteriorly extended rostral cartilage and by anterolaterally expanded antorbital cartilages; rostral cartilage projecting forward towards snout tip in a straight line or at a slight angle; snout not formed into a rostral saw and without lateral saw teeth. Five small gill openings on underside of front half of pectoral-fin bases, not visible in lateral view; no gill sieves or rakers on internal gills. Eyes dorsolateral on head and just anterior and partly medial to spiracles. Spiracles with or without small papillae; when papillae are present these are never elongated; spiracles without elevated rims or with small rims; spiracles circular to oval in shape. Mouth transverse and straight, without prominent knobs and depressions but with strong labial folds and a prominent groove around its periphery. Nostrils just anterior to mouth and separated from it by much less than the space between them, connected by broad nasoral grooves with mouth; anterior nasal flaps usually short but medially expanded and fused into a broad nasal curtain that slightly overlaps mouth. Oral teeth small, with a rounded or oval base and short to moderately long cusp, either blunt or sharp; teeth not laterally expanded and plate-like, similar in shape. Teeth and part of tooth bands remain exposed when mouth is closed (except in *Diplobatis*, not occurring in area); exposed tooth bands rounded to angular in outline; between 12 and 33 exposed rows in either jaw (adults); upper tooth band usually with more rows. Pectoral fins originating at anterior edges of snout lateral to snout tip, attached to most of head and ending posterior to or opposite pelvic-fin origins; disc not notched and subdivided opposite eyes. Large kidney-shaped electric organs at bases of pectoral fins, these visible through skin. Pelvic fins low, subangular or rounded, not divided into anterior and posterior lobes. Two moderately large and almost equal-sized and widely separated or close-set dorsal fins present, these of similar angular or subangular shape with distinct apices, anterior, posterior and inner margins, and free rear tips, or falcate. First dorsal fin originates behind anterior half of total length, base varying from over rear halves of pelvic-fin bases to behind rear tips of pelvic fins and junction between trunk and tail but well anterior to midlength of tail. Caudal fin large, about as large as pelvic fins, not shark-like, asymmetrical or symmetrical, with vertebral axis hardly raised above body axis; lower caudal lobe not projecting outwards posteriorly. **Colour:** dorsal surface varies from whitish, yellowish, brownish, grey-brown, greenish, reddish, or black above, usually white below but black in deep-water species; dorsal surface either unspotted or with small to large dark spots, blotches, bars or lines, or white spots and line, sometimes forming complex eye-shaped spots or ocelli on pectoral fins.

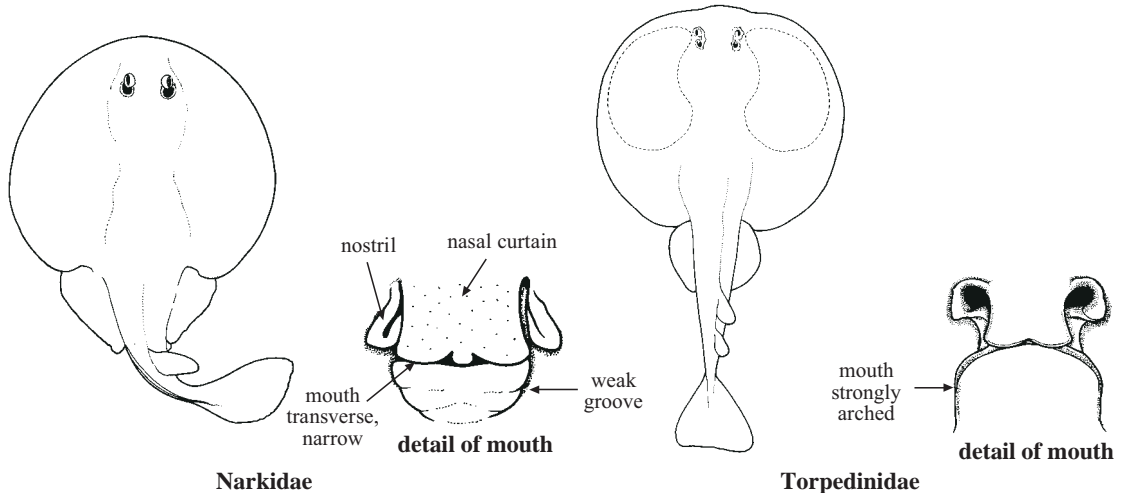


Habitat, biology, and fisheries: Numbfishes are a moderately large group of inshore to deep-water batoids of almost circumglobal distribution that are found in warm-temperate to tropical continental and continental insular waters. They occur off sandy beaches, in muddy enclosed bays, in estuaries, on coral reefs, off river mouths, and on the upper continental slopes, from the intertidal down to a depth of 1 071 m. Numbfishes are apparently unable to penetrate fresh water to any extent and are absent from rivers and lakes. They are slow-swimming bottom-dwellers, often found on soft mud or sandy bottoms. All species are ovoviparous as far as is known. Numbfishes feed on invertebrates and small fishes which are ingested on the bottom; their jaws and mouths are highly protrusible as a tube that enables them to extract bottom organisms from the substrate. Numbfishes are caught as minor bycatches of small, local inshore fisheries and in offshore trawl fisheries. They can deliver a moderate shock to the unwary when disturbed or captured if contact is made with the pectoral electric organs, but are otherwise inoffensive to people. Utilization of these rays is uncertain, but they seem not to be regularly consumed as food.

Similar families occurring in the area

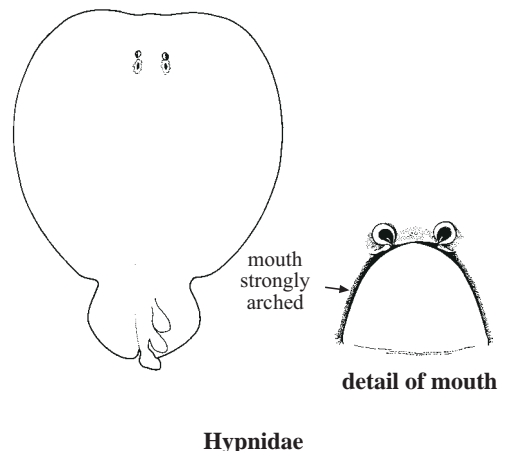
Narkidae: species in the area with a single dorsal fin or no dorsal fins; snout supported by a narrow, rod-like rostral cartilage; nasal curtain narrow and longer with numerous sensory pores throughout entire length; antero-posteriorly elongate nostrils; snout shorter; mouth with shallow groove and around its periphery.

Torpedinidae: snout truncate; pectoral disc transversely elipical and normally much greater in length and width than tail; mouth strongly arched and without labial folds or a peripheral groove; dorsal fins close together; first dorsal fin normally much larger than second; caudal fin much larger than dorsal fins.



Hypnidae: spiracles with long papillae; pectoral disc longitudinally pear-shaped; mouth strongly arched and without labial folds or a peripheral groove; teeth tricuspidate; tail, dorsal and caudal fins very small; tail barely projecting beyond pelvic fins; caudal fin as high as dorsal fins.

No other batoids in the area combine strong tails with a large round pectoral disc and snout area, 2 dorsal fins, a large caudal fin, and a completely unscaled body.



Hypnidae

Key to the species of Narcinidae occurring in the area

Note: the following key and species accounts should be regarded as provisional because the regional taxonomy of this group is currently under revision. The identification of *Narcine* species in the region is difficult due to paucity of specimens in ichthyological collections, misapplication of names in the literature and the extreme similarity of certain species. Any specimens of *Narcine* obtained from the region should be forwarded to relevant ichthyological collections.

1a. Eyes extremely reduced, embedded in integument, barely visible as obscure spots anterior to spiracles (Fig. 1a); dorsal and ventral surfaces dark brown; caudal fin more than 1/3 length of tail (as measured from cloaca); lateral tail folds reduced to very low and inconspicuous ridges; fleshy dorsal fins about as tall as length of their bases *Benthobatis* sp.

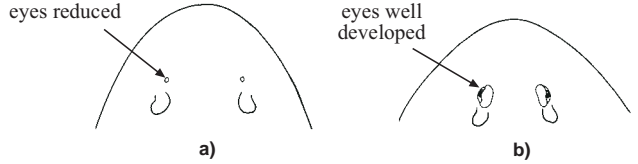


Fig. 1 anterior part of body (dorsal view)

1b. Eyes developed, not embedded in integument, functional and easily visible dorsally anterior to spiracles (Fig. 1b); ventral surface white, creamy-white or yellowish; caudal fin much less than 1/3 length of tail; lateral tail folds wide; dorsal fins not fleshy and taller than length or their bases → 2

2a. Tail (measured from cloaca) distinctly longer than disc length (1.3 or more times) → 3

2b. Tail not longer than disc, shorter than disc or about the same size → 5

3a. Dorsal surface of disc intensely marked with small and large spots and blotches, smaller spots surrounding larger ones, large spots sometimes fused, appearing oval or antero-posteriorly elongated *Narcine* sp. A

3b. Dorsal surface of disc without any markings, uniformly light brown, or brownish yellow → 4

4a. Dorsal surface of disc light brown; spiracle usually without an elevated rim; eyes and spiracles roughly the same size *Narcine* sp. C
(tropical eastern Australia)

4b. Dorsal surface of disc brownish yellow; spiracle usually with an elevated rim; eyes slightly larger than spiracles *Narcine* sp. B
(tropical eastern Australia)

5a. Dorsal coloration uniform light brown without spots; eyes small, much smaller than spiracles and over 6 in preorbital length *Narcine brunnea*

5b. Dorsal coloration with darker spots and blotches of varying size and pattern; eyes larger, subequal or slightly small than spiracles and less than 5 in preorbital length → 6

6a. Dorsal coloration with larger and smaller dark spots and blotches, the larger spots are few, circular, much larger than the smaller spots (3 or more times larger in diameter); large spots normally situated lateral to the eyes and spiracles (if present), laterally at mid-disc and posteriorly on disc → 7

6b. Dorsal coloration with dark spots of more or less same size only, occasionally with spots fusing into elongated blotches, but without pattern of circular, larger spots situated lateral to eyes and spiracles and laterally and posteriorly on disc → 10

7a. Lower and upper exposed tooth bands of equal width, lower tooth band wide and rounded in outline posteriorly (Fig. 2a); numerous spots closely set forming complex reticulated network dorsally, with larger spots slightly faded and dark background colour (south of Java and Bali) *Narcine sp. D*

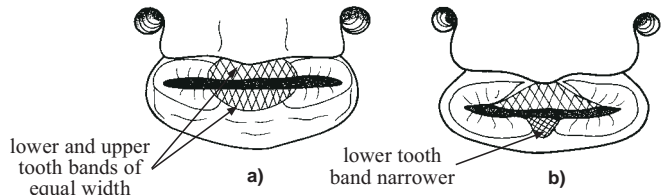


Fig. 2 region of mouth and nostrils

7b. Lower tooth band narrow, not as wide as upper tooth band, lower tooth band not wide and angular in outline posteriorly (Fig. 2b); dorsal coloration composed of smaller and larger spots not forming complex network of reticulated pattern → **8**

8a. Anterior portion of pelvic fins expanded laterally into long lobes, posterior margins of pelvic fins concave; numerous small spots on caudal fin *Narcine breviliata*
(probably occurs in the area off Viet Nam, but confirmed records are pending)

8b. Anterior portion of pelvic fins not expanded laterally into lobes, posterior margins of pelvic fins straight or convex; caudal fin without numerous small spots → **9**

9a. Posterior ventral margin of pelvic fins and disc with dark outline (Fig. 3a); dark to greyish brown caudal and dorsal fins, contrasting with lighter background colour of disc and tail region; dorsal fins wide, with rounded posterior margins; snout area with darker background colour and faint spots; posterior pelvic-fin margins adjoin tail ventrolaterally, leaving conspicuous free lobes (fig. 3a); pelvic fins straight posteriorly *Narcine maculata*

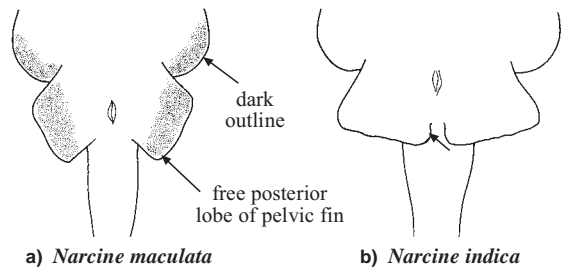


Fig. 3 ventral view of pelvic fins and disc

9b. Posterior ventral margins of pelvic fins and disc uniformly coloured, without dark outline (Fig. 3b); caudal and dorsal fins with uniform light brown colour same as background of disc and tail region; dorsal fins not wide and with relatively straight posterior margins; snout area with same light brown background colour and well-defined spots; posterior pelvic-fin margins adjoin tail ventrally, leaving very small free lobes (Fig. 3b); pelvic fins slightly convex posteriorly *Narcine indica*

10a. Small, numerous regular black and dark brown spots on very light brown background; small blackish spots on caudal fin; most spots about the size of eyes or less, very few spots larger than eyes *Narcine prodorsalis*

10b. Larger and more sparse dark brown spots over a brown background; no small blackish spots on caudal fin; spots regularly larger than eyes. → **11**

11a. Circular, large spots on dorsal disc, much larger than eyes; first dorsal fin begins posterior to pelvic fins *Narcine timlei*

11b. Numerous spots on dorsal disc, covering most of disc, occasionally fusing into elongate pear-shaped spots, occasionally with larger spot anterior to first dorsal fin; first dorsal fin begins over posterior ends of pelvic fins *Narcine lingula*

List of species occurring in the area

(Based mainly on data from a revision of family currently in preparation)

The symbol ♠ is given when species accounts are included.

- ♠ *Benthobatis* sp.^{1/}
- ? *Narcine brevilabiata* Bessednov, 1966^{2/}
- ♠ *Narcine brunnea* Annandale, 1909^{3/}
- ♠ *Narcine indica* Henle, 1834^{3/}
- ♠ *Narcine ligula* Richardson, 1946^{3/}
- ♠ *Narcine maculata* (Shaw, 1804)^{3/}
- ♠ *Narcine prodorsalis* Bessednov, 1966^{3/}
- ♠ *Narcine timmlei* (Bloch and Schneider, 1801)^{3/}
- ♠ *Narcine* sp. A [Last and Stevens, 1994]^{1/}
- ♠ *Narcine* sp. B [Last and Stevens, 1991]^{1/}
- ♠ *Narcine* sp. C [Last and Stevens, 1994]^{1/}
- ♠ *Narcine* sp. D
- ? *Narcine* sp. E [P. Last, photograph]^{4/}

References

- Bessednov, L.N. 1969. The fishes of the gulf of Tonkin. Part I. Elasmobranchii. *IZV. T.I.N.R.O.*, (66):138 p.
- Last, P.R. and J.D. Stevens. 1994. *Sharks and rays of Australia*. CSIRO, Australia, 512 p.
- Monkolprasit, S. 1984. *The cartilaginous fishes (class Elasmobranchii) found in Thai waters and adjacent areas*. Kasetsart Univ., Thailand, 175 p.

1/ New species being formally described elsewhere.

2/ Recorded from off northern China and Viet Nam (Gulf of Tonkin); possibly from Taiwan Province of china as well. Probably occurs in the area off Viet Nam, but no confirmed records exist. similar to *Narcine maculata* and is possibly synonymous.

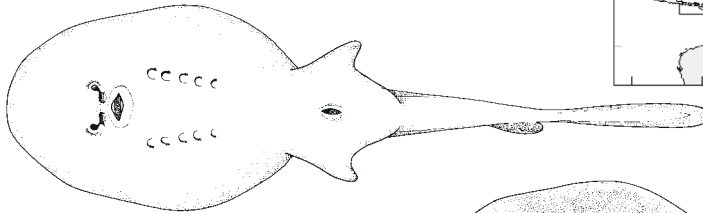
3/ Nominal species that are applied provisionally, based on common usage in the literature, and that may be changed based on work in progress (some nominal species may be synonyms of others).

4/ Not included in key to species. Maximum total length unknown. Only known from a photograph, no specimens presently available. Biology, utilization pattern in area, and distribution unknown

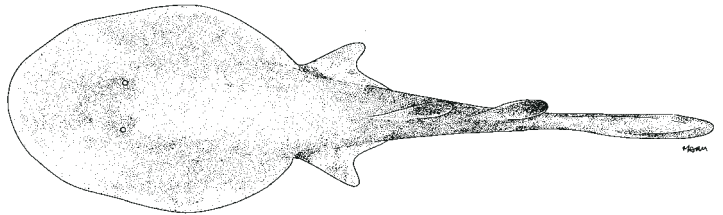
***Benthobatis* sp.**

En - Taiwanese blind numbfish.

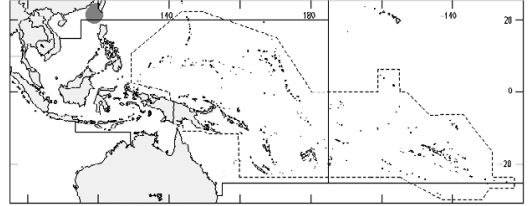
Maximum total length unknown; female (adult?) specimen 25.4 cm. Biology little known, Not utilized commercially in the area. Recorded from off southwestern Taiwan Province of China only, presumably from deep water (precise records presently unavailable), as *Benthobatis* is an offshore deep-sea genus from the continental slope region. A new species distinct from *B. moresbyi* known from both sides of the Arabian Sea and western Indian Ocean, from depths of 787 to 1 071 m.



ventral view

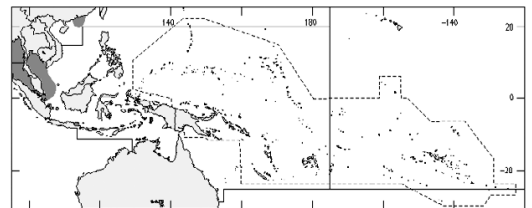
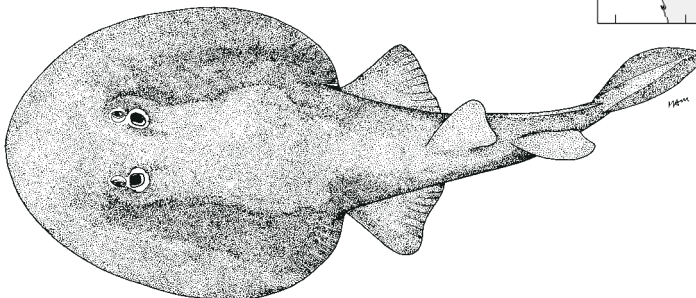


dorsal view

***Narcine brunnea* Annandale, 1909**

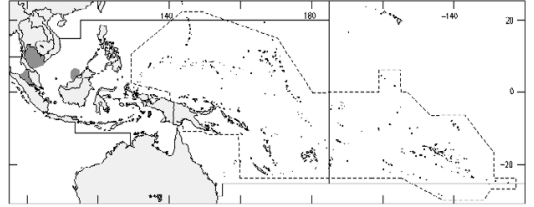
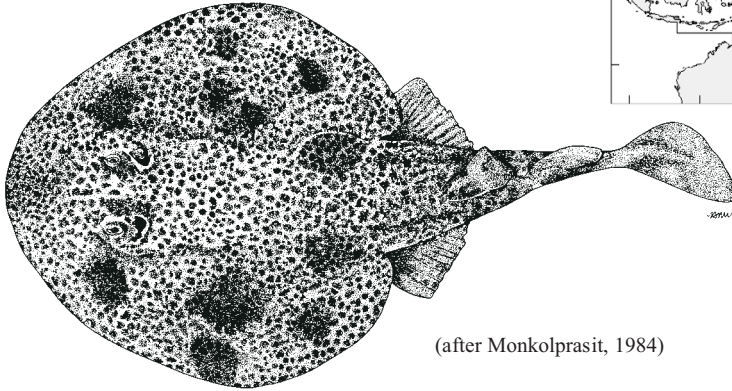
En - Brown numbfish.

Maximum total length about 22 cm, adult males at least 13.7 cm. A small, conspicuous inshore and offshore numbfish of continental tropical waters, apparently with a widespread distribution. Biology little known. Utilization pattern in the area not known. Occurs off Pakistan, India, Sri Lanka, Gulf of Thailand (precise locality unknown), Malaysia (Selangor), Indonesia (eastern Sumatra and Padang), and possibly southern China.

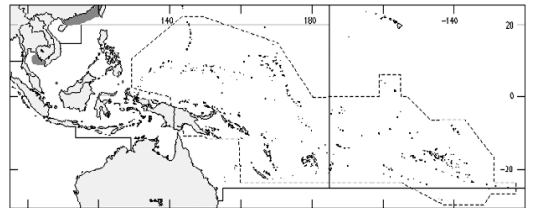
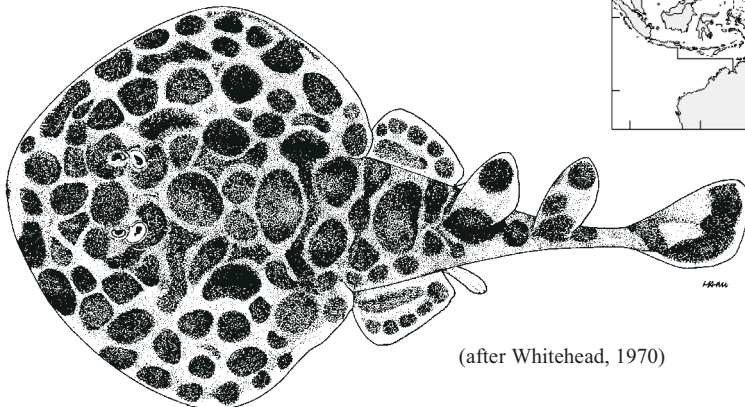


Narcine indica Henle, 1834**En** - Largespotted numbfish.

Maximum total length recorded about 30.5 cm; immature female specimen about 17.5 cm total length. A small inshore umbfish of tropical waters with a restricted (confirmed) distribution. Biology little known. Utilization pattern in the area not known. Occurs off Thailand (specific locality not recorded), Malaysia (Sarawak, ?Pinang), and Brunei, but probably more widespread in the area. Nominal records from adjacent areas are probably not of this species.

***Narcine lingula*** Richardson, 1846**En** - Chinese numbfish.

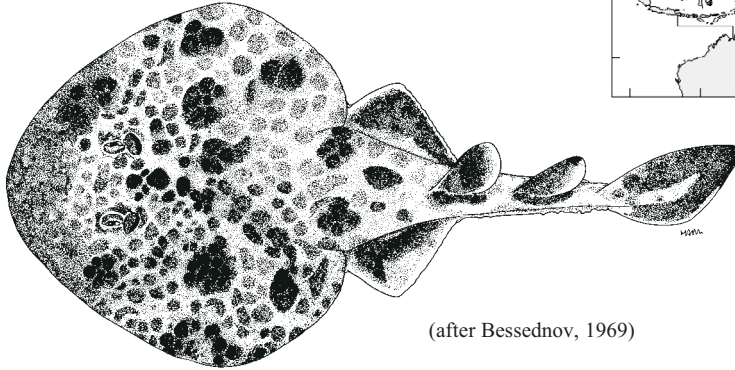
Maximum total length about 33 cm; 19.5 cm immature male (close to adult) from Cambodia. An inshore and offshore numbfish of continental tropical waters. Biology little known. Utilization pattern in the area not known. Occurs off Cambodia, China, Taiwan Province of China, and possibly Viet Nam (needs confirmation); actual distribution may be more widespread in area. A 26.5 cm female specimen from India possibly of this species.



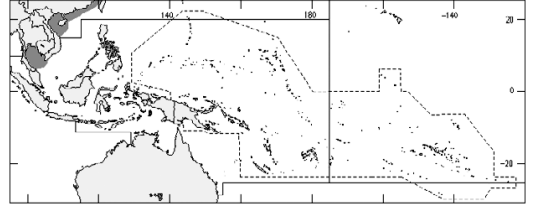
Narcine maculata (Shaw, 1804)

En - Darkfinned numbfish.

Maximum total length about 33.5 cm. An inshore numbfish of tropical continental waters, with a restricted (confirmed) distribution, from depths of 30 to 80 m. Biology little known. Utilization pattern in the area not known. Occurs off the Philippines (Sibuyan and Visayan Seas), China (Hong Kong), Thailand (locality not specified), Viet Nam (Gulf of Tonkin), possibly Malaysia (?Pinang), and Taiwan Province of China.



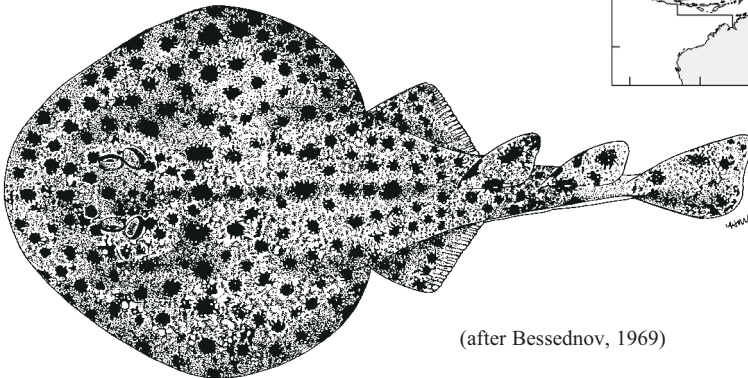
(after Bessednov, 1969)



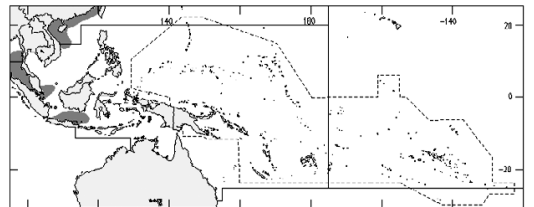
Narcine prodorsalis Bessednov, 1966

En - Tonkin numbfish.

Maximum total about 40 cm. An inshore and offshore numbfish of continental tropical waters, from depths of 50 m. Biology little known. Utilization pattern in the area not known. Occurs off China (East China Sea, Shanghai), Viet Nam (at least in Gulf of Tonkin, but probably extends further south), Thailand (Andaman Sea), Singapore, Indonesia (Java), and India (needs confirmation), but possibly more widespread in the area.

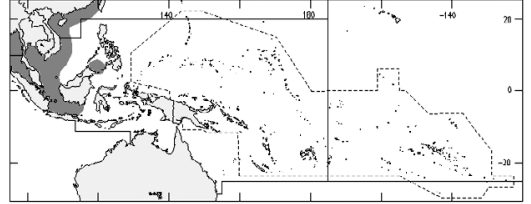
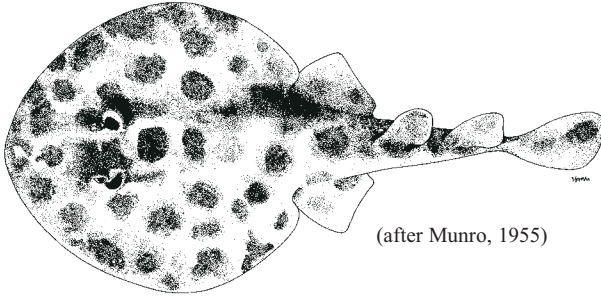


(after Bessednov, 1969)

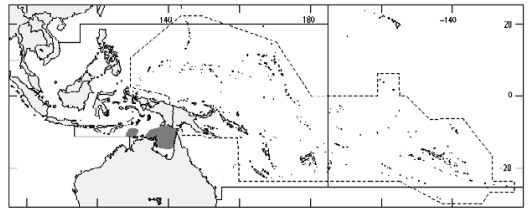
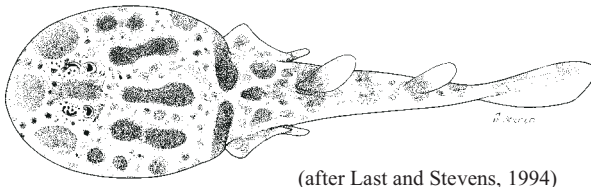


Narcine timlei (Bloch and Schneider, 1801)**En** - Blackspotted numbfish.

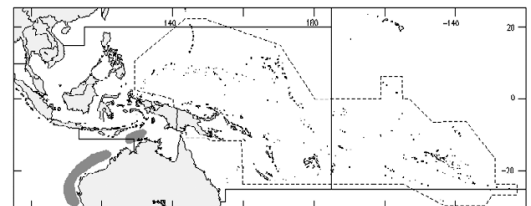
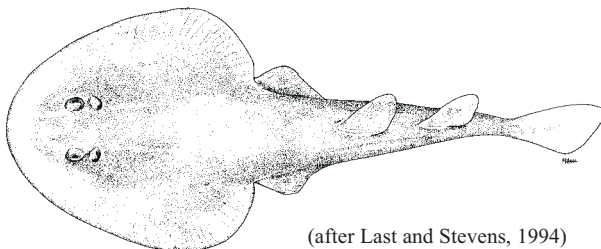
Maximum total length about 38 cm; possibly to 46 cm but this is uncertain; adult males from 27.6 cm total length (Gulf of Tonkin). A locally common inshore and offshore numbfish of continental tropical waters. Biology little known. Caught in local inshore and offshore fisheries but possibly not utilized in the area. Has a wide nominal distribution in the Indo-West Pacific from Pakistan, India, Sri Lanka, Malaysia, Singapore, Thailand, Viet Nam, Indonesia (Java, Sumatra), China, Taiwan Province of China, Japan, and the Philippines, but this may include more than 1 species.

***Narcine* sp. A** [Last and Stevens, 1994]**En** - Ornate numbfish.

Maximum total length about 24 cm. A little-known offshore numbfish of tropical Australian waters. Biology little known. Occurs on the continental shelf in depths of 45 to 65 m. Not utilized in the area. Occurs off northern Australia to New Guinea, in the Arafura Sea, Gulf of Carpentaria and Torres Strait, Northern Territory (Wessel Islands) to Queensland (Cape York); also few specimens probably of this species from north of Bathurst Island, in the Timor Sea, from a depth of 132 m.

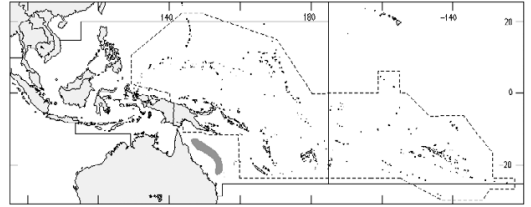
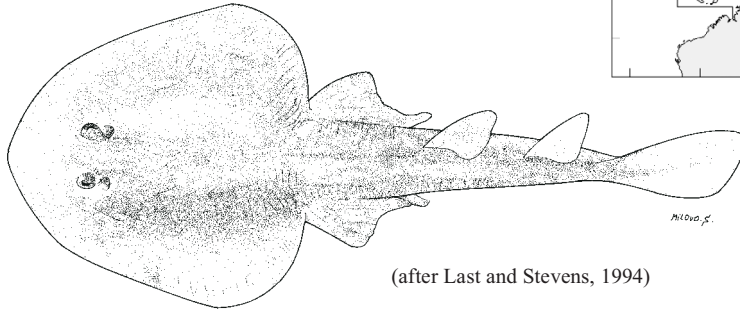
***Narcine* sp. B** [Last and Stevens, 1994]**En** - Western numbfish.

Maximum total length about 37 cm; adult at 26 cm. A little-known offshore numbfish of tropical western Australia. Biology little known. Occurs on the continental shelf in depths of about 170 to 360 m. Not utilized in the area. Occurs in an extensive area, from the Houtman Abrolhos region (possibly even further south in Western Australia) to the Arafura Sea.



***Narcine* sp. C** [Last and Stevens, 1994]**En** - Eastern numbfish.

Maximum total length about 35 cm, males mature at 24 cm. An offshore numbfish of the tropical east coast of Australia. Biology little known. Occurs on the continental slope at depths of 200 to 540 m (more commonly to 360 m). Not utilized in the area. Occurs off northern Queensland, Australia, from Townsville to Rockhampton.

***Narcine* sp. D****En** - Indonesian numbfish.

Maximum total length unknown, at least 30.5 cm (female specimen, presumably adult). An offshore numbfish, known from the continental shelf from a depth of 60 to 63 m. Superficially similar to *Narcine brevilibiata* and *N. maculata* (differing in the arrangement of mouth and tooth bands). Biology little known. Utilization in the area not known. Occurs off the southern coast of Indonesia (Java and Bali).

